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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/847,746	05/01/2001	Robert Bartola	257/267	6090

7590 08/19/2004

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EXAMINER

DATSKOVSKIY, MICHAEL V

ART UNIT	PAPER NUMBER
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2835

DATE MAILED: 08/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/847,746

Applicant(s)

BARTOLA ET AL.

Examiner

Michael V Datskovskiy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12,14,17-24,26,28-35 and 38-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 12,14,17-24,26,28-35 and 38-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 12, 14, 17-18, 21, 23-24, 26, 28-29, 32, 34, 38-39, 42, 44 rejected under 35 U.S.C. 102(b) as being anticipated by previously cited Dubuisson et al.

Dubuisson et al teach an assembly, Figs. 1-2, comprising: a plurality of heat generating transistor dies attached to a plurality of mounting areas of a multiplayer printed circuit board 10, and a thermal management system comprising a coolant circulation loop including: a separate heat sink having an interior lumen; a separate pump for circulating a liquid or gas coolant, and a channel in a layer of the PCB in communication with said lumen and said pump and in the vicinity of said mounting areas (col.3, line 50 through col.4, line 23), wherein a portion of said channel in said PCB is formed by removal of portions of one or more layers of the PCB, and another portion of the channel is formed by coinciding vias 24, 25, Fig.1 in adjacent layers 12-16 of the PCB 10 (col. 3, lines 37-49 and col. 4, line 25 through col. 5, line 10).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 19, 22, 30, 33, 40, 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dubuisson et al in view of Seshan et al.

Dubuisson et al teach all the limitations of the claims except said one of the surfaces of said heat generating transistor dies is in direct contact with said coolant. Seshan et al teach an assembly 10, Figs.1-4, comprising: a plurality of heat-generating packages 14 each including semiconductor die 144 mounted on a substrate 142; said heat-generating packages 14 attached to a multi-layer circuit board (PCB) 22; a thermal management system comprising: a pump 140 separate from the PCB 22; a heat sink 110 separate from said PCB 22; and a coolant circulation loop, wherein parts of said loop are formed as channels in layers of the multi-layer circuit board 22, and part of said loop is an interior lumen of said heat sink 110. Seshan et al teach furthermore: said coolant could be in a gas or liquid form; and a portion of said channels is formed by a surface of said packages 14 to provide direct contact between them and said coolant. It would have been obvious to one skilled in the art at the time invention was made to employ direct contact between heat generating components and the coolant as it is shown by Seshan et al in the device by Dubuisson et al in order to enhance heat dissipation in order to employ one of the well known in the art technological methods: chemical etching or machining channels in a layer of a circuit board.

5. Claims 20, 31 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dubuisson et al in view of Little.

Dubuisson et al teach all the limitations of the claims except said transistor die as attached to a mounting flange which in turn is attached to said circuit board communicating with said cooling channels. Little teaches an assembly, Figs.1-19, comprising: a heat generating device 19 or 94 (a chip or a transistor) attached to a multiplayer printed circuit board without a flange (device 19) or through a flange 71 (device 94), and a thermal management system comprising a pump (condenser and compressor respectively, col.5, lines 40-46) arranged for circulating a coolant through a coolant circulation channel loop 29, 31, wherein one part of the loop is formed in a layer of the PCB, and wherein a portion of the coolant cooling channel is in a vicinity of a mounting area of a flange 71 of said heat generating device 94. It would have been obvious to one skilled in the art at the time invention was made to employ a flange between a heat-generating device and a cooling channel on a surface of a PCB as it is shown by Little in the device by Dubuisson et al in order to facilitate sealing of said cooling liquid loop.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

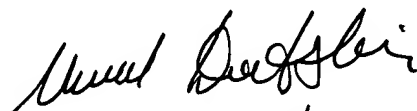
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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V Datskovskiy whose telephone number is (571) 272-2040. The examiner can normally be reached on 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Feild can be reached on (571) 272-2092. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


08/18/04

Michael V Datskovskiy
Primary Examiner
Art Unit 2835